AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1-60. (Cancelled)

61.   (New) A refrigeration system comprising:

a plurality of refrigeration circuits each having an evaporator pressure regulator, an expansion valve, and an evaporator in fluid communication, wherein said evaporator pressure regulator regulates suction pressure for a respective refrigeration circuit and said expansion valve expands refrigerant superheat through a respective evaporator;

at least one compressor in fluid communication with said plurality of refrigeration circuits and operable to output a cooling capacity;

a sensor operable to indicate a cooling demand for said plurality of refrigeration circuits; and

a control system operable to control said evaporator pressure regulators independently of said expansion valves for each of said plurality of refrigeration circuits, wherein said control system adaptively controls said cooling capacity to meet said cooling demand and operates one or more of said evaporator pressure regulators at approximately fully open.

62.   (New) The system of Claim 61, wherein said cooling demand is determined by monitoring at least one of the following: refrigeration circuit pressure, refrigeration case temperature, product temperature, and valve opening percent.

63.   (New) The system of Claim 61, wherein said control system adaptively controls said suction pressure of each of said plurality of refrigeration circuits through control of a valve position of each of said plurality of evaporator pressure regulators.

64.   (New) The system of Claim 63, wherein said control system adaptively controls said suction pressure of each of said plurality of refrigeration circuits through control of a valve position of each of said plurality of evaporator pressure regulators and at least one of refrigeration circuit pressure, refrigeration case temperature, and product temperature.

65.   (New) A refrigeration system comprising:

a plurality of refrigeration circuits each having an evaporator pressure regulator, an expansion valve, and an evaporator in fluid communication, said evaporator pressure regulator regulating suction pressure for a respective refrigeration circuit and said expansion valve expanding refrigerant superheat for a respective evaporator;

at least one compressor in fluid communication with said plurality of refrigeration circuits and operable to output a cooling capacity;

a sensor assembly operable to measure operating parameters of said plurality of refrigeration circuits; and

a control system operable to determine a cooling demand based on said operating parameters, control said at least one compressor to output said cooling capacity to meet said cooling demand, and control suction pressure of each refrigeration circuit by controlling a position of said evaporator pressure regulator independently of said respective expansion valve in each of said plurality of refrigeration circuits.

66.   (New) The system of Claim 65, wherein said control system is further operable to position at least one of said evaporator pressure regulators approximately fully open while controlling said cooling capacity to meet said cooling demand.

67.   (New) The system of Claim 65, wherein said controller is operable to control said suction pressure until said evaporator pressure regulator is one hundred percent open.

68.   (New) The system of Claim 65, wherein said controller adaptively controls said suction pressure for each of said plurality of refrigeration circuits based on said operating parameters and said position of said evaporator pressure regulator.

69.   (New) In a refrigeration system, a control system operable to meet cooling demand and control suction pressure for a plurality of refrigeration circuits each including an evaporator pressure regulator and an expansion valve, said controller operable to control said evaporator pressure regulators independently of said expansion

valves to meet said cooling demand by determining a change in a measured parameter and controlling at least one of said evaporator pressure regulators based upon said change to an approximately fully open position.

70.   (New) The controller of Claim 69, wherein said measured parameter is temperature.

71.   (New) The controller of Claim 69, wherein said measured parameter is an average of multiple temperature measurements.

72.   (New) The controller of Claim 69, wherein said measured parameter is pressure.

73.   (New) The controller of Claim 69, wherein said measured parameter is an evaporator pressure regulator valve position.

74.   (New) A method comprising:

determining a cooling demand for a plurality of refrigeration circuits;

operating an electronic evaporator pressure regulator for each of said plurality of refrigeration circuits to regulate a suction pressure of a respective refrigeration circuit;

operating an expansion valve to superheat refrigerant in each of said respective refrigeration circuits;

measuring an operating parameter for at least one of said refrigeration circuits; and

controlling each of said electronic evaporator pressure regulators independently of said expansion valves for said respective refrigeration circuit; and

meeting said cooling demand while adaptively controlling at least one of said evaporator pressure regulators to an approximately fully open position based upon said measuring.

75.   (New)   The method of Claim 74, wherein said measuring includes measuring a refrigerant pressure.

76.   (New)   The method of Claim 75, wherein said controlling includes controlling said evaporator pressure regulators based upon said refrigerant pressure measurement.

77.   (New)   The method of Claim 74, wherein said measuring includes measuring temperature.

78.   (New)   The method of Claim 77, wherein said controlling said electronic pressure regulators includes averaging said temperature measurement.

79.   (New)   The method of Claim 77, further comprising determining an error value between said temperature measurement and a circuit temperature set point.

80.   (New) The method of Claim 79, further comprising determining a percent value opening for said evaporator pressure regulators based upon said error value and electronically adjusting a valve position of said evaporator pressure regulators.

81.   (New) The method of Claim 80, further comprising determining said cooling demand based on one or both of said error value and said valve position.

82.   (New) A method comprising:

positioning an expansion valve proximate an evaporator in each circuit of a plurality of refrigeration circuits;

positioning an electronic evaporator pressure regulator in communication with said each circuit of said plurality of refrigeration circuits;

positioning a sensor in communication with said each circuit of said plurality of refrigeration circuits to measure an operating parameter;

communicating a compressor with said electronic evaporator pressure regulators; and

associating a control system with said compressor and said electronic evaporator pressure regulators, wherein said control system is operable to control said compressor while controlling electronic evaporator pressure regulators independently of said expansion valves to meet a demand for cooling and positioning at least one of said electronic evaporator pressure regulators at approximately fully open and positioning another of said electronic evaporator pressure regulators at less than approximately fully open based upon said measured operating parameter.

83.   (New) A method comprising:

detecting a temperature or pressure value in each refrigeration circuit of a plurality of refrigeration circuits;

comparing said detected values to a set point value;

updating an evaporator pressure regulator valve position based on said comparing; and

controlling a suction pressure of said refrigeration circuit independently of an expansion valve based on said updating until one of said evaporator pressure regulator valves is approximately fully open.

84.   (New) The method of Claim 83, wherein said comparing includes PID control.

85.   (New) The method of Claim 83, wherein said comparing includes determining an error value and said updating includes adjusting a valve position of each of said evaporator pressure regulators.

86.   (New) In a refrigeration system having a plurality of refrigeration circuits, a control system operable to control an evaporator pressure regulator suction pressure independently of evaporator refrigerant superheat to meet cooling demand, and a sensor assembly providing refrigeration case temperature and evaporator pressure regulator valve position data to said control system to determine cooling demand.

87. (New) The controller of Claim 86, further operable to adaptively control a suction pressure of said refrigeration system until said evaporator pressure regulator is approximately fully open.

88. (New) The controller of Claim 86, wherein said refrigeration case temperature is an average of multiple temperature measurements.

89. (New) A refrigeration system comprising:

a plurality of refrigeration circuits each having an evaporator pressure regulator, an expansion valve, and an evaporator in fluid communication, wherein said evaporator pressure regulator regulates suction pressure for a respective refrigeration circuit and said expansion valve expands refrigerant superheat through a respective evaporator;

at least one compressor in fluid communication with said plurality of refrigeration circuits and operable at a compressor capacity between a minimum and maximum compressor capacity;

a temperature sensor operable to measure a refrigeration case temperature of at least one of said plurality of refrigeration circuits; and

a control system operable to control said evaporator pressure regulators independently of said expansion valves for each of said plurality of refrigeration circuits, wherein said control system determines said compressor capacity based on a valve position of said at least one evaporator pressure regulator and said refrigeration case temperature.